

APPLIED
MOTOR
CONTROLS

H1 Series

Low Voltage Variable Frequency Drive

9-820 A

4-450 kW

380-460 V

AuCom



BENSHAWGROUP
Benshaw | AuCom



Table of contents

AUCOM H1 SERIES	4
APPLICATION IN THE INDUSTRY	5
PRODUCT ADVANTAGES	6
CHARACTERISTIC FUNCTION	7
PRODUCT SELECTION	8
MODELS AND TECHNICAL PARAMETERS OF H1 SERIES	9
TECHNICAL PARAMETER	10
CONNECTION DIAGRAM	12
BASIC I/O DATA	13
INSTALLATION MODE	14
SELECT ACCESSORIES	15
LV PACKAGING SOLUTIONS	16
AUCOM APPLIED MOTOR CONTROLS	18

AuCom H1 Series

THE H1 IS A MULTI-PURPOSE LOW-VOLTAGE VFD

H1 Series has rich hardware configuration and powerful software and accommodates multiple communication protocols. As a high-performance general-purpose VFD series that adopts a book-type design and meets the needs of more installation regions. They provide excellent driving performance and control functionality and enable automatic production equipment applications in various industries such as printing, hoisting, metallurgy, machine tools, wiredrawing, glass, food, fans, water pumps, etc.

Benefits

AT A GLANCE

- Ease of use and reliability
- Book-type design
- Green and high-efficiency
- Multi-drive and versatile



Application in the industry



MINING



FOOD



WOODWORKING



ELEVATORS



TEXTILES



CERAMICS



LOGISTICS



CONVEYOR TECHNOLOGY

Product advantages

BOOK-TYPE DESIGN

- Independent vertical straight-through air duct for heat dissipation Side-by-side installation to save the footprint
- Narrow-body scheme: with a small footprint and high power density

MULTI-DRIVE

- Multiple motor control types such as SPM, 1PM, SynRM and IM are supported to meet the diversified motor needs of the customers
- Rich peripherals are available, CANopen/PROFIBUS-DP/PROFINET/Ethernet/IP/EtherCAT, multiple encoder cards, friendly human-machine interaction is provided and multiple industrial application macros are supported

GREEN & HIGH EFFICIENCY

- Automatic energy saving control: Improve the control efficiency for no-load motors in fans and water pumps their no-load current values can be reduced by 30 %
- Energy control: To increase the operational efficiency the deceleration time can be shortened

EASE OF RELIABILITY AND USE

- Switching between English, German and Spanish interfaces
- Standard-configuration LCD keypad
- Parameter classification and quick copying



Characteristic function



ROTATIONAL SPEED UP TO ZERO

- Design for crane application: Adopted to support the open-loop zero-speed hold function of asynchronous motors with the default maximum frequency of 599 Hz
- Supporting high-speed running (with the potential of supporting higher frequency values, such as 500 Hz); such VFDs can be used to control magnetic suspension centrifuges and machine tool spin dies



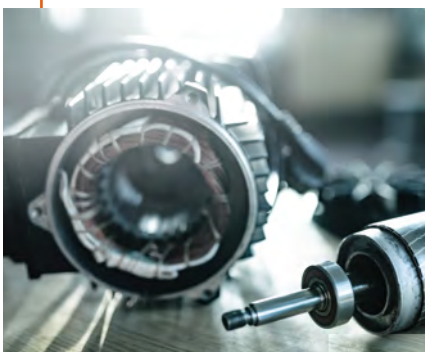
PRESSURE CONTROL

- Pressure control algorithm eliminates the necessity of purchasing a tension controller when tension control is wanted
- Different available modes:
 - Tension closed-loop speed mode
 - Linear speed closed-loop speed mode
 - Tension closed-loop torque mode
 - Tension open-loop torque mode



POSITION CONTROL

- Position control algorithm for positioning function
- Point-to-point control: The location of the target is sent through communication, a pulse signal

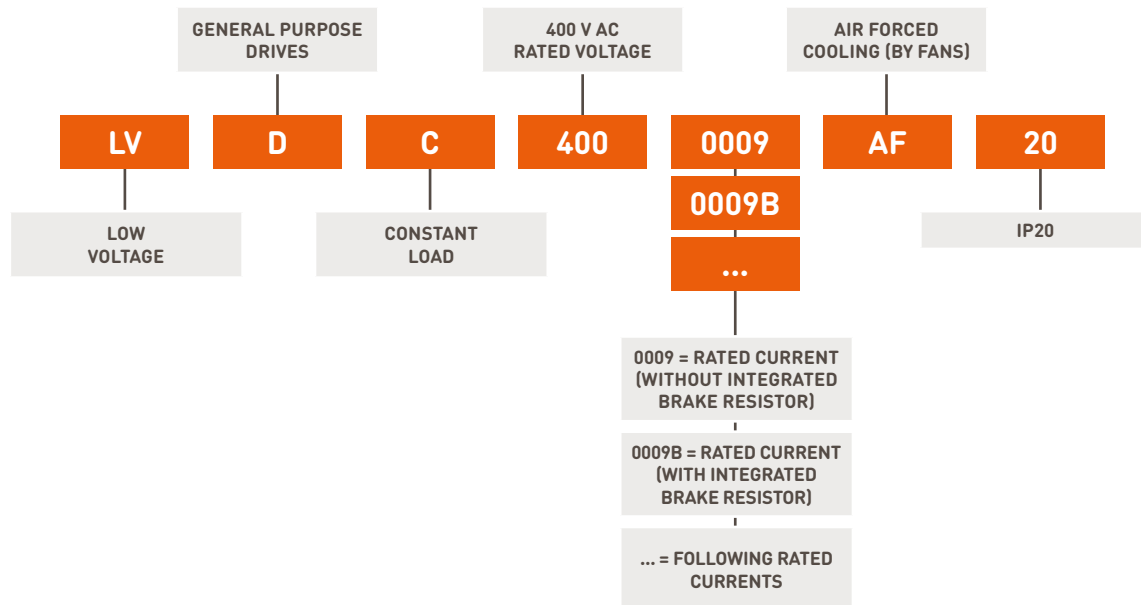


SYNCHRONOUS RELUCTANCE MOTOR CONTROL

- Synchronous reluctance motors are characterised by high robustness, high reliability and efficiency, energy savings, a wide speed range and easy maintenance
- Rotor without any winding: higher efficiency compared with conventional AC asynchronous motor, due to no rotor copper loss
- No permanent magnet/accordingly lower cost compared with a permanent magnet motor, due to easy flux weakening and no demagnetization risk

Product selection

PRODUCT CODE



DESCRIPTION

- All the VFDs have the three-phase voltage level of 380 V~480 V: FS1–FS4 VFDs have no inductors; :ilC6 VFDs have a standard-configuration DC reactor each.
- All the VFDs have the three-phase voltage level of 380 V~480 V: FS1–FS3 VFDs have a standard-configuration brake unit; for FS4–FS6 VFDs, a brake unit can be selected.
- (-L) indicates that there is a pedestal; for FS8–FS10 VFDs. A Inductor for Input and Output can be selected as an option.

Models and technical parameters of H1 Series

VARIABLE FREQUENCY DRIVE

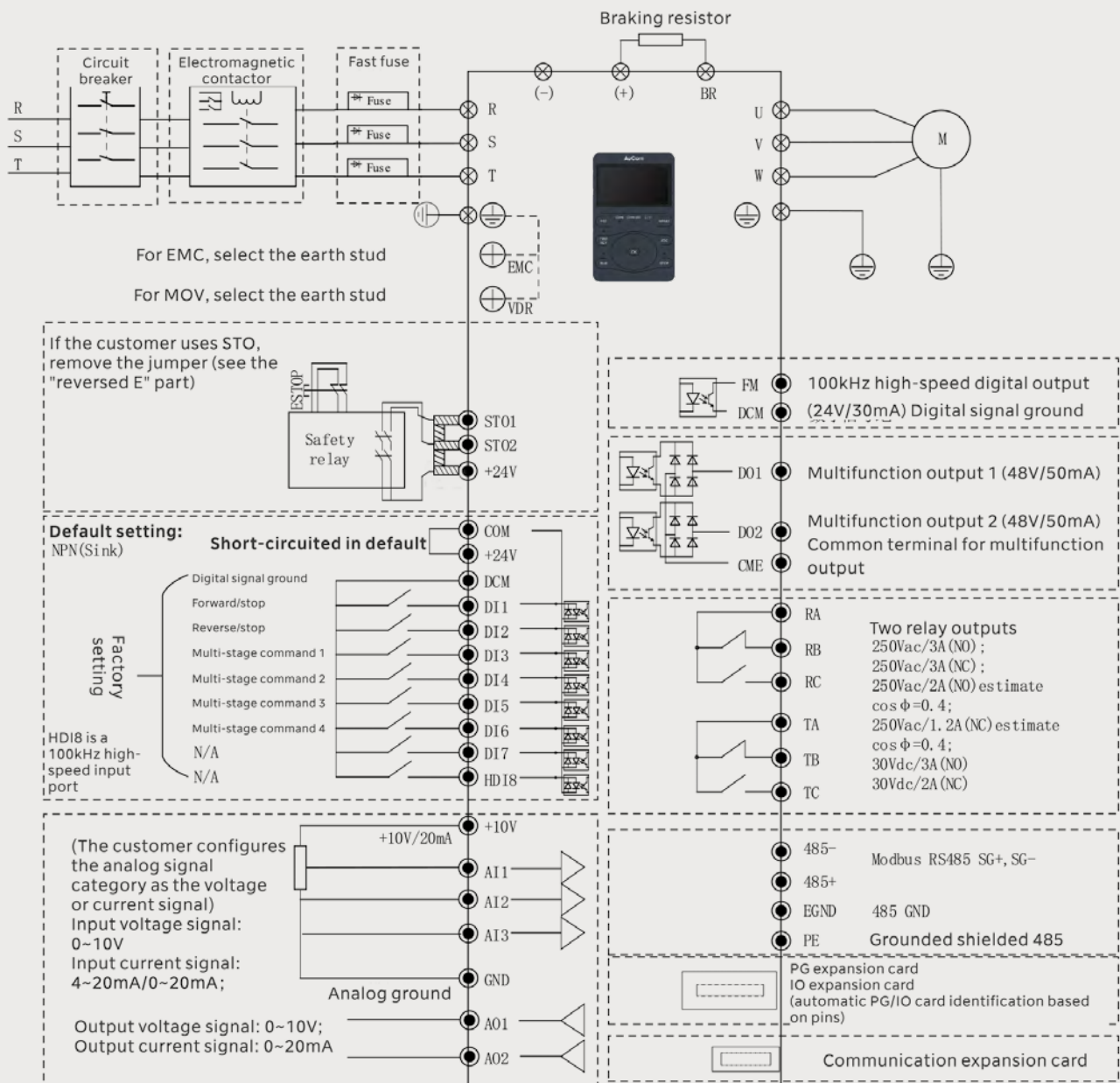
PRODUCT CODE	INPUT VOLTAGE [V]	INPUT FREQUENCY [Hz]	OUTPUT VOLTAGE [V]	INPUT CURRENT [A]	OUTPUT CURRENT [A]	APPLICABLE MOTOR [kW]	FRAME SIZE	FRAME DIMENSION W x D x H (mm)	NET WEIGHT [kg]
LV-D-C-400-0009B-AF-20	380-480 V AC -15 %/ +10 %	50/60 Hz	0-460 V AC	11,4	9	4	FS1	100 x 178 x 235	2
LV-D-C-400-0013B-AF-20				16,7	13	5,5	FS1	100 x 178 x 235	2
LV-D-C-400-0017B-AF-20				21	17	7,5	FS1	100 x 178 x 235	2
LV-D-C-400-0025B-AF-20				32	25	11	FS2	118 x 200 x 320	3,5
LV-D-C-400-0032B-AF-20				41	32	15	FS2	118 x 200 x 320	3,5
LV-D-C-400-0037B-AF-20				47	37	18,5	FS3	140 x 245 x 365	6
LV-D-C-400-0045B-AF-20				56	45	22	FS3	140 x 245 x 365	6
LV-D-C-400-0060B-AF-20				72	60	30	FS3	140 x 245 x 365	6
LV-D-C-400-0075-AF-20				88	75	37	FS4	180 x 260 x 430	13
LV-D-C-400-0075B-AF-20									
LV-D-C-400-0090-AF-20				110	90	45	FS4	180 x 260 x 430	13
LV-D-C-400-0090B-AF-20									
LV-D-C-400-0110-AF-20				106	110	55	FS5	250 x 362 x 593	47,5
LV-D-C-400-0110B-AF-20									
LV-D-C-400-0152-AF-20				139	152	75	FS5	250 x 362 x 593	47,5
LV-D-C-400-0152B-AF-20									
LV-D-C-400-0176-AF-20				165	176	93	FS5	250 x 362 x 593	47,5
LV-D-C-400-0176B-AF-20									
LV-D-C-400-0210-AF-20				190	210	110	FS6	270 x 370 x 640	49,5
LV-D-C-400-0210B-AF-20									
LV-D-C-400-0253-AF-20				230	253	132	FS6	270 x 370 x 640	49,5
LV-D-C-400-0253B-AF-20									
LV-D-C-400-0304-AF-20				276	304	160	FS7	290 x 425 x 780	80,5
LV-D-C-400-0340-AF-20				314	340	185	FS7	290 x 425 x 780	80,5
LV-D-C-400-0380-AF-20				346	380	200	FS8	300 x 506 x 1101	121,5
LV-D-C-400-0426-AF-20				380	426	220	FS8	300 x 506 x 1101	121,5
LV-D-C-400-0465-AF-20				435	465	250	FS8	300 x 506 x 1101	121,5
LV-D-C-400-0520-AF-20				478	520	280	FS9	340 x 545 x 1248	167,5
LV-D-C-400-0585-AF-20				534	585	315	FS9	340 x 545 x 1248	167,5
LV-D-C-400-0650-AF-20				598	650	355	FS9	340 x 545 x 1248	167,5
LV-D-C-400-0725-AF-20				672	725	400	FS10	340 x 545 x 1389	207,5
LV-D-C-400-0820-AF-20				742	820	450	FS10	340 x 545 x 1389	207,5

Technical parameter

ITEMS		SPECIFICATIONS
Main control functions	Maximum Output frequency	599.00 Hz
	Carrier frequency	7.5 kW and below: 2 kHz–15 kHz 11 kW–93 kW: 2 kHz–10 kHz 110 kW–450 kW: 2 kHz–6 kHz Automatic carrier frequency adjustment can be done according to the load characteristics
	Input frequency resolution	Digital setting: 0.01 Hz; analog setting: maximum frequency x 0.025 %
	Control mode	Asynchronous motors: V/F, WC, SVC and FVC
		Permanent magnet motors: SVC, WC and FVC
	Starting torque	SVC: 150 %; FVC: 180 %
	Speed regulation range	SVC: 1:200; FVC: 1:1000
	Speed stability accuracy	SVC: $\leq \pm 0.5$ %; FVC: $\leq \pm 0.3$ %
	Torque response	Torque step response < 20 ms
	Torque accuracy	SVC: ± 10 %; FVC: ± 5 %
	Overload capacity	150 % of rated current (60 s)
	Torque boost	Automatic and manual torque boost modes are included
	V/F curve	Multi-point V/F curve; 1.5-power V/F curve; square V/F curve
	Acceleration and deceleration curve	Linear or s-shaped acceleration/deceleration modes: there are four groups of acceleration/deceleration time values Acceleration/deceleration time range: 0.00 s–600.00 s or 0.00 s–6000.00 s
	DC braking	Start DC braking and shutdown DC braking are included (0.00 s–60.00 s)
	JOG control	JOG frequency range: 0.00 Hz–599.00 Hz; JOG acceleration/deceleration time range: 0.00 s–600.00 s or 0.00 s–6000.0 s
	Tension control	Four control modes are included: tension closed-loop speed mode, linear speed closed-loop speed mode, tension closed-loop torque mode and tension open-loop torque mode
	Multi-speed running	Up to 16-speed running can be realized through terminals
	Built-in PID	Can easily realize closed-loop process control
Perso- nalized functions	Peripheral safety self-test	A safety test is performed on the peripherals to timely identify any problems, such as a grounding problem or a short-circuit and improve the reliability of the system
	Common DC busbar function	A common DC bus can be shared by multiple VFDs
	JOG key	The JOG key on the operation panel can be used for jog running
	Fast current limiting function	A quick current limiting algorithm is embedded to reduce the probability that an overcurrent fault happens to the VFD
	Motor parameter identification	Automatic motor parameter identification
	Standardized panel extension cable	A constant voltage output can be maintained in case of grid voltage variations
	Communication buses	At least six kinds are supported (Modbus, Profinet, CANopen, Profibus-DP, EtherCAT and Ethernet)
	Expansion function	I/O expansion card; bus communication expansion cards; PG cards (incremental sin/cos encoder cards)
	STO	Safe torque off in case of emergency

ITEMS		SPECIFICATIONS
Operation	Frequency sources	Multiple frequency setting sources: operation panel setting, analog setting, control terminal setting, communication setting, etc.
	Auxiliary frequency sources	Multiple auxiliary frequency sources: operation panel setting, analog setting, control terminal setting, communication setting, etc.; auxiliary frequency fine tuning and synthesis can be flexibly realized
	Universal terminals	Eight DI terminals (one high-speed terminal), three DO terminals (one high-speed terminal), and two relay output terminals. Three AI terminals (one supporting PT100), two AO terminals, two STO terminals and one RS485 terminal.
	Automatic acceleration/ deceleration	Automatic acceleration/ deceleration time adjustment based on the load torque
Display and panel operation protections and options	LCD display	English, German and Spanish are supported
	LCD parameter copying	Quick parameter copying can be accomplished on the LCD panel
	Protection functions	Motor short-circuit detection, input/output phase loss protection, overcurrent protection, overvoltage protection, undervoltage protection, overtemperature protection, overload protection, etc.
	Options	Brake assembly
Environment	Use place	Indoor, free from direct sunlight, dust, corrosive gas, flammable gas, oil mist, water vapour, dripping water or salt, etc.
	Altitude	≤ 2,000 m ASL; 1 % current derating for every 100 m above 1000 m ASL The maximum application elevation is 3,000 m; when the elevation is higher than 3,000 m, contact the manufacturer
	Ambient temperature	-10°C~+50°C; 1 % current derating for every 1°C above 40°C
	Humidity	< 95 % (RH), w/o water droplets
	Vibration	< 5.9 m/s ² (0.6 g)
	Storage temperature	-20°C~+60°C
	Pollution degree	No electrically conductive dust permitted. Cooling air must be clean and free from corrosive materials. Chemical gases, class 3C3. Solid particles, class 3S2. Painted circuit boards as standard. (according to IEC 60721-3-3)
Product standards	Applied safety standard	IEC61800-5-1:2007
	Applied EMC standard	IEC61800-3:2005

Connection diagram



Changes without prior notice!

Note: The AuCom H1 VFD have an integrated braking unit between 11 and 30 kW, between 37 kW and 132 kW this can be included as an option. From 150 kW there is internally no braking unit option. Braking unit can be added external. Please contact the manufacture for more information.

Basic I/O data

INPUTS CONTROL SIGNALS: ANALOG (DIFFERENTIAL), 4 CHANNELS

Analog voltage / current	0 - \pm 10 V / 0–20 mA via switch
Max. input voltage	+30 V
Input impedance	10 k Ω (voltage) 500 Ω (current)
Resolution	12 bit
Hardware accuracy	0.5 % Type + 1 LSB
Non-linearity	1 LSB

DIGITAL: 8 CHANNELS

Input voltage	HIGH:11 V LOW:5 V
Max. input voltage	+ 30 V DC
Input impedance	< 3.3 V DC: 3 k Ω , \geq 3.3 V DC: 3 k Ω
Signal delay	\leq 8 ms

OUTPUTS CONTROL SIGNALS: ANALOG, 2 CHANNELS

Output voltage / current	0–10 V / 0–20 mA via software setting
Maximum output voltage	+ 15 V at 5 mA cont.
Output impedance	10 Ω
Resolution	10 V 1% 20 mA 1%
Maximum load impedance for current	500 Ω
Hardware accuracy	10 V 1% 20 mA 1%
Offset	3 LSB
Non-linearity	2 LSB

DIGITAL, 2 CHANNELS

Output voltage	High > 20 V DC at 50 mA, > 23 V DC open Low < 1 V DC at 50 mA
----------------	--

RELAY, 3 PCS.

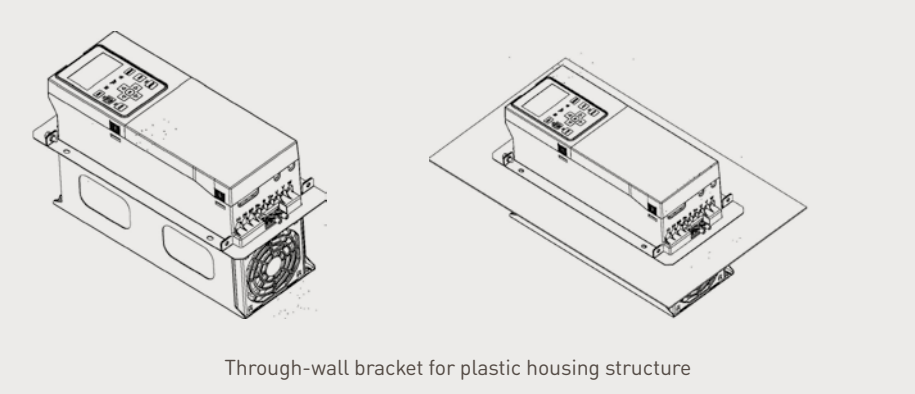
Contacts	0.1–2 A / rev max. 250 V AC or 30 V DC
----------	--

NOMINAL VOLTAGES

+ 10 V DC	+ 10 V DC at 10 mA / + 30 mA max.
+ 24 V DC	+ 24 V DC / + 100 mA max.

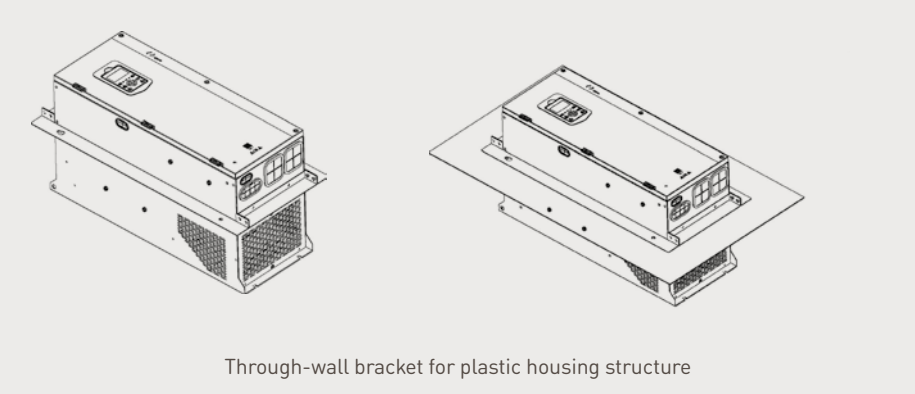
Installation mode

THROUGH-WALL INSTALLATION MODE FOR PLASTIC HOUSING STRUCTURE

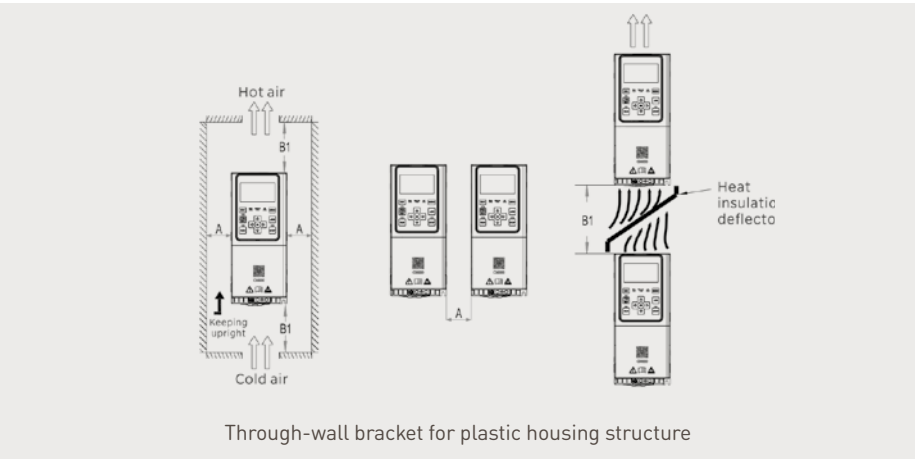


THROUGHWALL
INSTALLATION

THROUGH-WALL INSTALLATION MODE FOR SHEET METAL STRUCTURE



WALL
MOUNTIN



Select accessories

INDUCTORS (INPUT DC INDUCTOR AND OUTPUT AC INDUCTOR)

- Input DC inductor: improves the input-side power factor of the VFD and suppresses higher harmonic currents
- Output AC inductor: increases the effective transmission distance of the VFD, suppresses output harmonic currents, increases the output high-frequency impedance, and effectively suppresses dv/dt .

BRAKING RESISTOR

- To shorten the deceleration time, the resistance is used to consume the regenerated energy of the motor

(for < 30 kW H1 series VFDs, the resistance is a standard-configuration part; for 37 kW–132 kW H1 series VFDs, the resistance is an optional part)

EMC FILTER

- Input filter: suppresses the pulses from the VFD through the input power cable electromagnetic interferences into a public power grid
- Install the filter as close as possible to the input terminal of the VFD



LV Packaging Solutions

LET'S USE SYNERGIES

The LV Packaging Solutions cabinets has been especially developed for the implementation of motor control in the special customer application. The devices are individually produced as single unit or as small series, configured, and tested in Sendenhorst, Germany.

On request we pack and deliver them worldwide.



You know your application; we know the right drive technology.

The cabinets can be equipped with additional elements, such as circuit breakers, fuse load disconnectors, but also communication cards, temperature controllers or other components.

The shown options are only a short selection of the Aucom MCS® solutions.

Contact us so that we can develop the ideal concept according to the customer specification and your requirements.

At a glance

- **Perfect match to the application**
- **Motor control via:**
 - DOL-start
 - Star- / Delta-Start
 - Soft Starter
 - VFD
- **Best price / performing ratio**
- **Additional components to integrate:**
 - Circuit Breakers
 - Semiconductor fuses
 - Disconnecting switch
 - Contactor for disconnecting, forward/backward, etc.
 - Door mount keypad/HMI with protective cover
 - Communication cards for remote access and control
 - Control Power Transformer
 - Space heater control Terminal strip for customer control logic
 - ...



AuCom Applied Motor Controls

We develop motor control products for industrial applications across the world. Our focus on research and development, as well as manufacturing, supply and support, ensures that when you choose to work with AuCom, you're working with a global leader. Forty years of experience added to our expertise and ability means you can rely on us to get it right from the start.

OUR APPROACH



We start with a challenge or application, working with you to define and develop a solution that's not only fit for purpose today, but fully supported into tomorrow.

OUR PARTNERS

We choose partners that are experts, not only in, soft start and motor control, but in understanding the needs of their industry. We work closely with our partners to ensure customers receive only the best support and advice.

OUR PEOPLE

The power behind our success doesn't rely on our innovative products alone. Our people play a pivotal role. That's why, with AuCom, it's always personal. Combining dedication and experience with ability and passion, we don't just listen more closely, we draw on the breadth of our expertise to better understand your unique requirements and offer real solutions and ongoing support.

-  Sales, Service & Manufacture
-  Sales & Service
-  Sales, Service & Manufacture (Benshaw)



APPLIED
MOTOR
CONTROLS

Follow us on social media



AuCom



AuCom is a global company specialising in complete motor control solutions. Our Medium and Low Voltage Soft Starters and Variable Speed Drives (VFDs) are engineered to the highest standards.

AuCom is recognised as the world's leading specialists in Motor Control: from concept and design to prototyping, creation of software and hardware, to the finished product. Whether you need basic motor starting or comprehensive motor control and protection, AuCom has a soft starter or VFD that matches.

AuCom's Competence Center for Global Solutions is located in Sendenhorst, Germany and our Low Voltage Competence Center is located in Christchurch, New Zealand. With regional offices in Dubai, South Korea, Egypt, the USA, China and Morocco, AuCom provides service and supplies products in more than 150 countries around the world.

AuCom Global Solutions

AuCom MCS GmbH & Co. KG

Borsigstraße 6, 48324 Sendenhorst, Germany

T + 49 2526 93880-0, sales@aucom.com

www.aucom.com



**APPLIED
MOTOR
CONTROLS**

Copyright AuCom MCS® GmbH & Co KG. All rights reserved. Copying and distribution of this pad, recovery and its contents is not permitted without express written authority. Offenders are liable to damages. All rights reserved, in particular for the granting of patents or registration.

Disclaimer

We have checked the contents of this publication agree with the hardware and software. Since deviations cannot be excluded, so that we do not accept liability for complete conformity. The information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.